CULTURAL CHANGES IN AEROSPACE

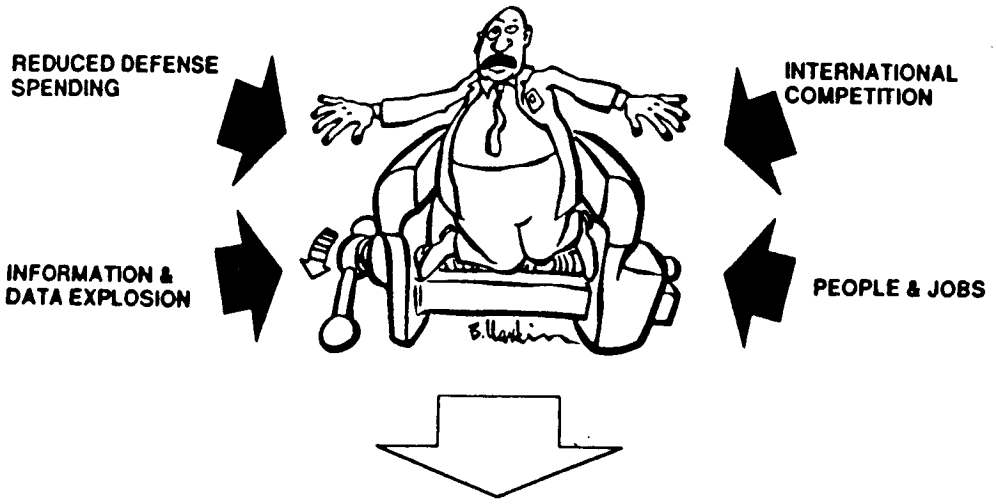
BILL STROBL

JUNE 1990

GENERAL DYNAMICS
Space Systems Division

WHAT'S HAPPENING

THE SQUEEZE IS ON AEROSPACE



- TOTAL QUALITY MANAGEMENT
- ELECTRONIC MEDIA

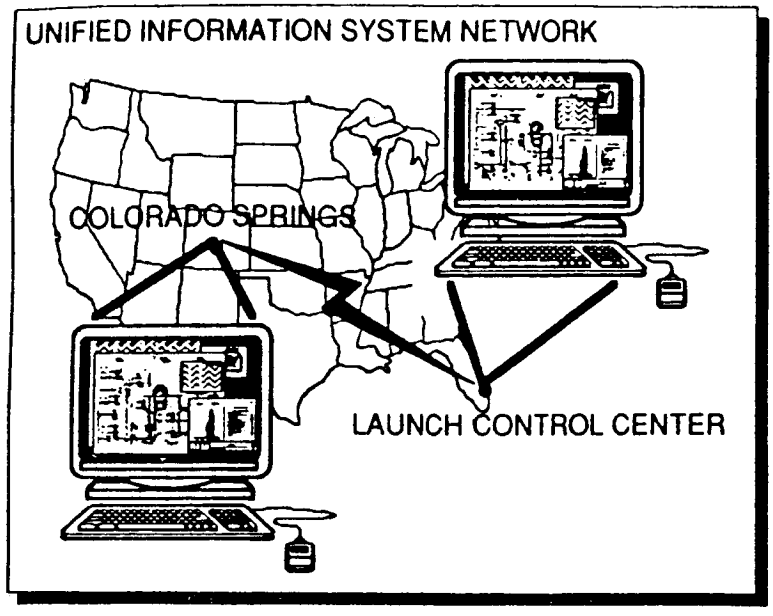
CULTURAL CHANGES ARE A WAY TO BREAK THE VISE

WHERE IS IT LEADING?

- Computers/Computer access for everyone
- Multi-Discipline Teams
  - Opportunity to be heard and contribute
  - Emphasis on processes and reducing variability
- Intercompany and International cooperation
  - Consortium/Teams/Cooperative ventures
- Younger Management
- Emphasis on listening to the "Voice of the Customer"
  - Exceed customer expectations, both external and internal
- Continuous improvement

WE ARE WITNESSING AN ERA OF CULTURAL CHANGE

COMMUNICATIONS
A New Generation of Systems



TOTAL ELECTRONIC ENVIRONMENT

- **PAPERLESS SYSTEMS**
- **INFORMATION TRANSFER NETWORKS**
- **DATA STORAGE & RETRIEVAL**
- **EXPERT SYSTEMS**
- **AND MORE**

A CULTURE SHOCK

PEOPLE AND JOBS

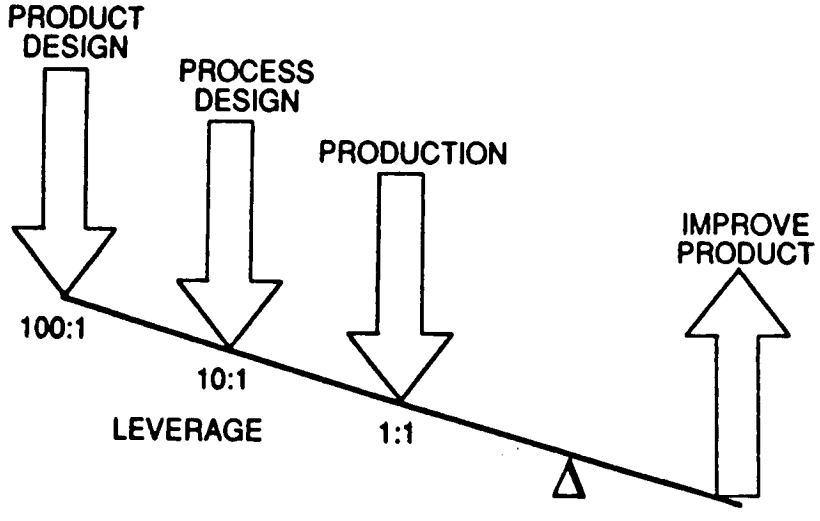
- Need to transfer our corporate knowledge to young people
  - Many of today's aerospace managers started in 1955 - 65 and are nearing retirement
  - Aerospace hiring was severely curtailed in 1969 -75
  - Many of our new managers will have less than 15 years experience
- Ambition and enthusiasm of our young people
- Motivation of employees and the opportunity to be heard
- Gain sharing

EXAMPLES OF CULTURAL CHANGES REQUIRED (Continued)

CATEGORY	PREVIOUS STATE	FUTURE STATE
Problem-Solving	Unstructured individualistic problem-solving and decision-making	Predominantly participative and interdisciplininary problem-solving and decision-making based on substantive data
Jobs and People	Functional, narrow scope management-controlled	Management and employee involvement; workteams; integrated functions
Management Style	Management style with uncertain objectives that instills fear of failure	Open style with clear and consistent objectives, which encourages group-derived continuous improvement
Role of Manager	Plan, organize, assign, control, and enforce	Communicate, consult, coach, mentor, remove barriers, and establish trust
Rewards and recognition	Pay by job. Few team incentives	Individual and group recognition and rewards, negotiated criteria
Measurement	Orientation toward data-gathering for problem identification	Data used to understand and continually improve processes

SOURCE: DoD 5000.51-G Final Draft

WHERE IS THE PAYOFF ?



ALS PHILOSOPHY

- Take some of the mystique out of the aerospace business
  - Emphasize the creative part at all levels
  - Make the rest easy and routine
- Make the system simple and robust
  - So it is more reliable and dependable
  - So it doesn't require rocket scientists to operate and maintain
  - To attract nationwide participation by both traditional aerospace and non-aerospace manufacturing companies

ROUTINE, RELIABLE, AFFORDABLE

ALS OPERABILITY CAPABILITIES ARE ANALOGOUS TO THOSE OF MILITARY TRANSPORT AIRCRAFT

"YOU CALL, WE HAUL"
- 95% Probability of Launch with 90% Confidence
- Broad Spacecraft Requirement Envelopes & Interface Standards

" END OF THE RUNWAY"
- Clean Pad - Rise-Off Umbilicals Mated/Checked Out in Factory
- All Ground Support Provided Through Launch Platform - No Towers

" FLY THROUGH FAILURE"
- Recoverable On-board Recorders
- Built-in-test & Automated Test
- Facilities Designed for 35%Surge

" OPERATIONAL ECONOMIES"
- Base Level Maintenance & Logistics
- Engine/Avionics Modularity & Ease of Removal/Replacement
- Commonality
- Technician Transparency

ADVANCED LAUNCH SYSTEM

NASA
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

OPERABILITY IN DESIGN

ASK THE MILITARY AIRLIFT COMMAND WHAT CONSTITUTES OPERABILITY:

- **HIGH AVAILABILTY & RELIABILITY**
- **HIGH THROUGHPUT AND ON-TIME PERFORMANCE (DEPENDABILITY)**
- **STANDARD VEHICLE-CARGO OPS (SIMPLE INTERFACES)**
- **BLUE SUIT OWNED & OPERATED**